



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

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November 29, 2016

Millennium Power Partners, LP  
10 Sherwood Lane  
Charlton, MA 01507

**RE: Charlton**  
Transmittal No.: X272799  
Application No.: CE-16-025  
Class: *OP*  
FMF No.: 342837  
**AIR QUALITY PLAN APPROVAL**

Dear Sir or Madam:

The Massachusetts Department of Environmental Protection (MassDEP), Bureau of Air and Waste, has reviewed your Administrative Amendment (Application) listed above. This Application concerns the proposed typographical correction to the existing Plan Approval Transmittal No X265042 for your power plant facility located at 10 Sherwood Lane in Charlton, Massachusetts (Facility).

This Application was submitted in accordance with 310 CMR 7.02 Plan Approval and Emission Limitations as contained in 310 CMR 7.00 "Air Pollution Control" regulations adopted by MassDEP pursuant to the authority granted by Massachusetts General Laws, Chapter 111, Section 142 A-O, Chapter 21C, Section 4 and 6, and Chapter 21E, Section 6. MassDEP's review of your Application has been limited to air pollution control regulation compliance and does not relieve you of the obligation to comply with any other regulatory requirements.

MassDEP has determined that the Application is administratively and technically complete and that the Application is in conformance with the Air Pollution Control regulations and current air pollution control engineering practice, and hereby grants this **Plan Approval** for said Application, as submitted, subject to the conditions listed below.

Please review the entire Plan Approval, as it stipulates the conditions with which Millennium Power Partners, LP (Permittee) must comply in order for the Facility to be operated in compliance with this Plan Approval.

**This Plan Approval (Tr. No. X272799) supersedes Plan Approval Tr. No. 265042 in its entirety.**

## **1. DESCRIPTION OF FACILITY AND APPLICATION**

The Millennium Power Partners, LP site is located adjacent to Route 169 in Charlton, Massachusetts. Charlton is located in Worcester County in south central Massachusetts. It lies approximately six miles north of the Connecticut border and approximately two miles southeast of the intersection of Interstate 90 (the Massachusetts Turnpike) and Interstate 84. The neighboring community is a mix of open space, industrial, commercial, and residential land uses.

The Permittee designed, constructed and operates a combined cycle electrical power generation facility of approximately 360 megawatt (MW) nominal output in Charlton, Massachusetts. The Facility consists of a combustion turbine generator (CTG) of approximately 230 MW output capacity, an un-fired exhaust heat recovery steam generator (HRSG), a nominal 130 MW steam turbine generator, a wet mechanical draft cooling tower, a water treatment system and auxiliary equipment.

Major auxiliary equipment associated with the facility includes a control room, a carbon monoxide catalyst, a selective catalytic reduction (SCR) system and control system, feed water and cooling water pumps, fuel oil and ammonia storage tanks, a continuous emission monitoring system and a 1.9 million British thermal units per hour (MMBtu/hr) emergency diesel fire pump engine.

The diesel engine for the fire pump is a John Deere Model JD FP-06WA, oil fired compression ignition stationary internal combustion engine. Because the engine was installed after June 1, 1990 but before March 23, 2006 and its energy input capacity is less than 3 MMBtu/hr, the engine is not subject to MassDEP regulations for emergency engines.<sup>1</sup> The engine is subject to federal regulations at 40 CFR 63 Subpart ZZZZ.

The Facility operates a Siemens Model 501G combustion turbine with a nominal capacity of 230 MW and a heat input of approximately 2,534 MMBtu/hr at an average ambient temperature of 60°F (original design).

The CTG utilizes natural gas as the primary fuel. The natural gas is fired at a rate of approximately 2,534,000 cubic feet per hour while operating at 100% rated capacity at 60°F. The backup fuel is distillate fuel oil with a sulfur content not to exceed 0.0015 percent by weight. The fuel oil is fired at a rate of approximately 20,300 gallons per hour (2,842 MMBtu/hr input) at 100% rated capacity at 0°F. The fuel oil is stored in a 1.2 million gallon above ground storage tank, which is physically limited to 950,000 gallon capacity.

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<sup>1</sup> See 310 CMR 7.02(2)(b)(8), 7.02(8)(i), 7.03(10) and 7.26(42)

Prior to the issuance of th Plan Approval X265042, the CTG was limited by a plan approval condition to operate at no less than 50% of the maximum gross megawatt output (load) while firing natural gas and 75% load while firing fuel oil.

The hot exhaust gases exiting the CTG pass through an unfired HRSG, which uses the heat from these gases to produce steam. The HRSG houses a carbon monoxide catalyst followed by an ammonia injection grid and the selective catalytic reduction catalyst for control of nitrogen oxides emissions.

The steam produced in the HRSG feeds into a condensing steam turbine to generate a nominal output of 130 MW of electric power. The Facility is designed to operate continuously except for equipment downtime to allow for servicing, maintenance, and repair activities. Operations also include evaporative cooling of the intake air for additional combustion turbine efficiency and capacity when ambient temperatures exceed 50°F and heating of inlet air used during colder ambient temperatures to prevent icing in the combustion turbine.

The emissions from the Facility are emitted to the ambient air through a stack, the top of which is 225 feet above ground level with an inside exit diameter of 19 feet, which provides for a design maximum exit velocity of 89 feet per second at a temperature of 242°F.

The Permittee applied to MassDEP to amend Plan Approval Tr. No. 130921(A) to allow the use of Steam Power Augmentation (SPAG) and Low Load Turn Down (LLTD). To implement both projects, the original CTG equipment manufacturer will install additional hardware including, but not limited to, piping, valves, electrical and thermocouples, and will implement software and logic changes to the existing controls. SPAG increases the CTG output during hours of high energy demand. SPAG is expected, when selected, to increase the CTG output by approximately 10 MW and the heat input rate by less than 1% above the original design rating at an average ambient temperature of 60°F. The use of SPAG is limited to natural gas combustion only.

LLTD allows the CTG to operate efficiently at loads below 50% load and is expected to reduce the number of starts and shutdowns. The Permittee requested MassDEP to remove the requirement to operate only at loads above 50% load while firing natural gas to accommodate LLTD. LLTD can be used with inlet heating. The use of LLTD is limited to natural gas combustion only.

The Permittee didn't request any changes to emission limits while firing natural gas, except that the current emission limits at 50% load would apply to emissions while operating below 50% load. The Permittee did request to lower emission limits for sulfur dioxide while firing fuel oil to reflect the use of ultra low sulfur diesel fuel.

Although emission limits while firing natural gas did not change because of the Application for X265042, certain stack emission parameters that could negatively affect the dispersion of air pollutants did change, particularly while using LLTD. The Application for X265042 included air quality modeling using these revised emission parameters. The modeling demonstrated that

emissions from the Facility after implementation of the two requested changes would not result in a violation of any National Ambient Air Quality Standard.

The Permittee requested to apply start and shutdown emission limits to a non-typical operating scenario known as protective load shedding. Protective load shedding occurs when a facility operational parameter is out of specification and, in order to protect the combustion turbine from damage, the combustion turbine load is reduced by operator action, the digital control system or mechanically, without stopping the combustion process. The Permittee expressed that allowing alternative emission limits during protective load shedding would reduce the number of shutdowns and restarts. This has the potential to reduce overall emissions during out of specification events that require action to protect the combustion turbine.

The Permittee requested the requirement in Plan Approval Tr. No. 130921(A) to conduct an annual test for efficiency be removed. MassDEP approved that request because the basis of the requirement, 310 CMR 7.04(4)(a), provided an exemption for combustion turbines.

At the Permittee's request, on May 11, 2000, the United States Environmental Protection Agency approved a custom fuel monitoring schedule for the nitrogen and sulfur content of natural gas and fuel oil under the authority at 40 CFR 60.334(b)(2) in lieu of the requirements in 40 CFR 60 Subpart GG: New Source Performance Standards for Stationary Gas Turbines. This schedule has been superseded by changes to 40 CFR 60 Subpart GG.

MassDEP approved the Permittee's requested amendments and Plan Approval Tr. No. X265042 issued on October, 26, 2016 made a number of changes to the Plan Approval Tr. No. 130921(A) including:

- accommodating SPAG and LLTD,
- accommodating protective load shedding,
- requiring emission testing when operating under LLTD,
- correcting typographical errors and rewording for clarity,
- redrafting the existing Plan Approval into the MassDEP's current plan approval format,
- updating emission limits for particulate matter and including emission limits for sulfuric acid mist.
- listing the cooling towers as emission units, and
- separating the 310 CMR 7.02 plan approval requirements from the descriptions of other application reviews, including: the Prevention of Significant Deterioration review, Non-Attainment review, the Massachusetts Environmental Policy Act and Section 61.

On November 7, 2016, the Permittee submitted an Administrative Amendment application to clarify Note 5 of Table 2A. MassDEP approves this requested change.

This Plan Approval (Tr. No. X272799) supersedes Plan Approval Tr. No. X265042 in its entirety, with the exception that all plan applications materials submitted as part of Plan Approvals Tr. Nos. X265042, 130921 and 130921 (A) become part of this Plan Approval, Tr. No. X272799.

## **Applicable Regulatory Requirements**

The Permittee shall comply with Federal New Source Performance Standards for stationary gas turbines at 40 CFR 60 Subpart GG - Standards of Performance for Stationary Gas Turbines for Emission Unit (EU) 1.

The Permittee shall comply with the Federal National Emission Standards for Hazardous Air Pollutants for reciprocating internal combustion engines at 40 CFR 63 Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines for the emergency diesel fire pump engine.

## **Other Regulatory Reviews**

MassDEP administers 40 CFR 60 Subpart KKKK – Standards of Performance for Stationary Combustion Turbines for Operating Permit sources under delegation from the US Environmental Protection Agency. Subpart KKKK applies to stationary combustion turbines with a heat input greater than 10 MMBtu that commenced construction, modification or reconstruction after February 18, 2005. In the Application for X265042, the Permittee evaluated whether implementation of SPAG and LLTD results in a modification or reconstruction of EU 1. That Application showed that the implementation was not a modification because EU 1's pound per hour emission rates for nitrogen oxides or sulfur dioxide were not increasing. The Application also showed that the implementation was not a reconstruction because the implementation of SPAG and LLTD would not result in replacing components. Therefore, the Facility is not subject to Subpart KKKK.

MassDEP administers the federal Prevention of Significant Deterioration (PSD) program under delegation from the US Environmental Protection Agency. PSD applies to major new sources of air pollutants and major modifications of existing sources located in an area designated attainment of National Ambient Air Quality Standards (NAAQS). When Millennium Power was first approved, potential emissions of sulfur dioxide, nitrogen oxides, particulate matter and carbon monoxide were above PSD thresholds. MassDEP issued a PSD Approval to Millennium Power on January 29, 1998, along with a Conditional Plan Approval under 310 CMR 7.02. In the Application for X265042, the Permittee evaluated whether the proposed emission changes resulting from the use of SPAG and LLTD were projected to increase emissions to the level of a 'major modification' under the PSD program.

The Application for X265042 showed that neither the use of SPAG nor LLTD, nor both together, was a major modification. (See the table below.) MassDEP agreed with the Permittee's analysis. Therefore, the requirements for processing a major modification of a PSD approval did not apply to that Application.

The Permittee also evaluated whether the major modification requirements under 310 CMR 7.00: Appendix A: Emission Offsets and Nonattainment Review apply. Nonattainment Review applies to major sources of air pollutants in an area designated nonattainment of an NAAQS.

The Permittee is subject to Appendix A because the potential emissions of nitrogen oxides, a precursor to ozone, are greater than 50 tons per year. The Conditional Plan Approval issued by MassDEP on January 29, 1998 included the Nonattainment Review approval. The Application for X265042 showed that neither the use of SPAG nor LLTD, nor both together, was a major modification. (See the table below.) MassDEP agreed with the Permittee's analysis. Therefore, the requirements for processing a major modification under 310 CMR 7.00 Appendix A did not apply to that Application.

<b>PSD and 310 CMR 7.00: Appendix A Major Modification Analyses (tons per year)</b>							
	NO <sub>x</sub>	CO	SO <sub>2</sub>	PM <sup>2</sup>	PM <sub>10</sub> <sup>3</sup>	PM <sub>2.5</sub> <sup>3</sup>	VOC
Projected Actual Emissions	74.4	55.6	3.8	9.5	31.3	31.3	5.1
Baseline Actual Emissions	69.0	27.5	3.5	8.9	29.2	29.2	1.1
Projected Emissions Increases	5.5	28.1	0.3	0.6	2.1	2.1	4.0
PSD Significance Threshold	40	100	40	25	15	10	N/A
310 CMR 7.00: Appendix A Threshold	25	100	40	N/A	15	N/A	25
Major Modification	No	No	No	No	No	No	No

The Facility is a natural area source of hazardous air pollutants (HAPs) because the Facility's potential to emit HAPs is much less than the major source thresholds of 10 tpy for a single HAP and 25 tpy for all HAPs.

The Appendix to this Plan Approval includes a history of the Plan Approvals issued to the Permittee up to this Application. The Appendix also includes information developed during the PSD review, the Emission Offset and Nonattainment review and other regulatory reviews.

## **2. EMISSION UNIT IDENTIFICATION**

Each Emission Unit ("EU") identified in Table 1 is subject to and regulated by this Plan Approval:

<b>Table 1</b>			
<b>Emission Unit Identification</b>			
<b>EU</b>	<b>Description</b>	<b>Design Capacity</b>	<b>Pollution Control Device (PCD)</b>
1	Siemens Model 501G combustion turbine	2,534 MMBtu/hr 230 MW	Selective catalytic reduction CO catalyst
2	Cooling tower	97,620 gallons per minute recirculation rate	Drift eliminators

<sup>2</sup> Filterable portion only

<sup>3</sup> Filterable and condensable portions.

**Table 1 Key:**

CO = Carbon monoxide  
EU = Emission Unit  
PCD = Pollution Control Device  
MW = Megawatts  
MMBtu/hr = Million British thermal units per hour

### 3. APPLICABLE REQUIREMENTS

#### A. OPERATIONAL, PRODUCTION and EMISSION LIMITS

The Permittee is subject to, and shall not exceed the Operational, Production, and Emission Limits as contained in Table 2A and 2B:

Table 2A						
Operational/Production and Emission Limits <sup>1</sup>						
EU	Operational / Production Limit	Air Contaminant	Emission Limit <sup>2, 3, 4, 5</sup>			
			Natural Gas			Fuel Oil
			100% load <sup>6</sup>	75% load	50% load or less	All loads between 100% and 75% load
1	1. 0.8 grains per 100 cubic feet sulfur content in natural gas	NOx	<ul style="list-style-type: none"> <li>• 37.0 lb/hr</li> <li>• 0.013 lb/MMBtu</li> <li>• 3.5 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 29.8 lb/hr</li> <li>• 0.013 lb/MMBtu</li> <li>• 3.5 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 22.0 lb/hr</li> <li>• 0.013 lb/MMBtu</li> <li>• 3.5 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 99.4 lb/hr</li> <li>• 0.035 lb/MMBtu</li> <li>• 9.0 ppmvd at 15% O<sub>2</sub></li> </ul>
	2. 720 hours fuel oil firing per 12 month rolling period	CO	<ul style="list-style-type: none"> <li>• 28.7 lb/hr</li> <li>• 0.01 lb/MMBtu</li> <li>• 4.0 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 23.2 lb/hr</li> <li>• 0.01 lb/MMBtu</li> <li>• 4.0 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 119.7 lb/hr</li> <li>• 0.07 lb/MMBtu</li> <li>• 30.0 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 37.9 lb/hr</li> <li>• 0.017 lb/MMBtu</li> <li>• 7.0 ppmvd at 15% O<sub>2</sub></li> </ul>
	3. 0.0015% sulfur content by weight in fuel oil	VOC	<ul style="list-style-type: none"> <li>• 3.7 lb/hr</li> <li>• 0.001 lb/MMBtu</li> <li>• 3.0 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 3.0 lb/hr</li> <li>• 0.001 lb/MMBtu</li> <li>• 3.0 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 13.2 lb/hr</li> <li>• 0.01 lb/MMBtu</li> <li>• 8.1 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 26.9 lb/hr</li> <li>• 0.01 lb/MMBtu</li> <li>• 7.0 ppmvd at 15% O<sub>2</sub></li> </ul>
	4. No fuel oil firing May 1 through September 30 inclusive except as allowed by Table 6 Item 12	PM/PM <sub>10</sub> /PM <sub>2.5</sub>	<ul style="list-style-type: none"> <li>• 20.2 lb/hr</li> <li>• 0.007 lb/MMBtu</li> </ul>	<ul style="list-style-type: none"> <li>• 16.2 lb/hr</li> <li>• 0.007 lb/MMBtu</li> </ul>	<ul style="list-style-type: none"> <li>• 12.0 lb/hr</li> <li>• 0.007 lb/MMBtu</li> </ul>	<ul style="list-style-type: none"> <li>• 56.8 lb/hr</li> <li>• 0.02 lb/MMBtu</li> </ul>
		SO <sub>2</sub>	<ul style="list-style-type: none"> <li>• 6.6 lb/hr</li> <li>• 0.002 lb/MMBtu</li> </ul>	<ul style="list-style-type: none"> <li>• 5.3 lb/hr</li> <li>• 0.002 lb/MMBtu</li> </ul>	<ul style="list-style-type: none"> <li>• 3.9 lb/hr</li> <li>• 0.002 lb/MMBtu</li> </ul>	<ul style="list-style-type: none"> <li>• 4.5 lb/hr</li> <li>• 0.0016 lb/MMBtu</li> </ul>

**Table 2A**

<b>Operational/Production and Emission Limits<sup>1</sup></b>						
<b>EU</b>	<b>Operational / Production Limit</b>	<b>Air Contaminant</b>	<b>Emission Limit<sup>2, 3, 4, 5</sup></b>			
			<b>Natural Gas</b>			<b>Fuel Oil</b>
			<b>100% load<sup>6</sup></b>	<b>75% load</b>	<b>50% load or less</b>	<b>All loads between 100% and 75% load</b>
		NH <sub>3</sub>	<ul style="list-style-type: none"> <li>• 39.1 lb/hr</li> <li>• 0.014 lb/MMBtu</li> <li>• 10.0 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 31.5 lb/hr</li> <li>• 0.014 lb/MMBtu</li> <li>• 10.0 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 23.3 lb/hr</li> <li>• 0.014 lb/MMBtu</li> <li>• 10.0 ppmvd at 15% O<sub>2</sub></li> </ul>	<ul style="list-style-type: none"> <li>• 40.8 lb/hr</li> <li>• 0.014 lb/MMBtu</li> <li>• 10.0 ppmvd at 15% O<sub>2</sub></li> </ul>
		Sulfuric acid mist	<ul style="list-style-type: none"> <li>• 2.81 lb/hr</li> <li>• 0.001 lb/MMBtu</li> </ul>			<ul style="list-style-type: none"> <li>• 3.07 lb/hr</li> <li>• 0.001 lb/MMBtu</li> </ul>
		Opacity	Opacity shall not exceed 10%, six minute block average, during all modes of operation including starts, shutdowns, and periods of protective load shedding.			
2	5. 9,160 mg/L total dissolved solids as potassium chloride, annual average	PM/PM <sub>10</sub>	<ul style="list-style-type: none"> <li>• 9.8 tpy</li> <li>• 1.63 tpm</li> </ul>			
Facility-wide		NO <sub>x</sub>	170 <sup>7</sup> tpy			
		CO	475 tpy			
		VOC	49 <sup>8</sup> tpy			
		PM/PM <sub>10</sub> /PM <sub>2.5</sub>	100 <sup>9</sup> tpy			
		SO <sub>2</sub>	28.9 tpy			
		NH <sub>3</sub>	153 <sup>10</sup> tpy			
		Sulfuric acid mist	11.2 tpy			

**Table 2A Notes:**

1. Operational/production limits and emission limits are the maximum allowed
2. The Permittee shall comply with the lb/hr, lb/MMBtu, and ppmvd emission limits in Table 2A based on a one-hour block average.
3. When operating on natural gas, the emission limits at loads between 100% and 75% load are calculated by taking a linear interpolation of the 100% and 75% load emission limits. When operating on natural gas, the emission limits at loads between 75% and 50% load are calculated by taking a linear interpolation of the 75% and 50% load emission limits.
4. See Table 4 Item 9 regarding determining compliance with the tpy emission limits.
5. The EU 1 lb/hr, lb/MMBTU, and ppmvd emission limits in Table 2A shall apply at all times EU 1 is operating except during start, shutdown, and periods of protective load shedding, unless otherwise noted. Emission

- limits in Table 2B for PM/PM<sub>10</sub>/PM<sub>2.5</sub>, CO, NH<sub>3</sub>, NO<sub>x</sub> and opacity shall apply during start, shutdown, and periods of protective load shedding
6. % Load refers to the operational load as calculated by the formula: % Load = actual EU 1 gross MW output/calculated EU 1 maximum gross MW output \* 100.
  7. Includes 3.0 tpy NO<sub>x</sub> from the emergency fire pump engine.
  8. Includes 1.0 tpy VOC emitted from miscellaneous sources.
  9. Includes 9.8 tpy PM/PM<sub>10</sub> emitted from cooling tower drift and 0.6 tpy PM/PM<sub>10</sub> from miscellaneous sources.
  10. Includes breathing and working losses from ammonia storage tanks.

**Table 2A Key:**

CO = Carbon monoxide  
CMR = Code of Massachusetts Regulations  
EU = Emission Unit  
HAP = Hazardous air pollutant  
lb = pound  
lb/hr = pound per hour  
lb/MMBtu = pounds per million British thermal units  
mg/L = milligrams per liter  
n/a = not applicable  
NH<sub>3</sub> = Ammonia  
MW = Megawatt  
ppmvd at 15% O<sub>2</sub> = parts per million by volume, dry basis, corrected to 15 percent oxygen  
PM = Particulate matter, filterable portion only  
PM<sub>10</sub> = Particulate matter less than or equal to 10 microns in diameter, filterable and condensable portions  
PM<sub>2.5</sub> = Particulate matter less than or equal to 2.5 microns in diameter, filterable and condensable portions  
SO<sub>2</sub> = Sulfur dioxide  
tpm = tons per month  
tpy = tons per 12 month rolling period  
VOC = Volatile organic compounds  
% = percent

Table 2B							
Start, Shutdown, and Protective Load Shedding Emission Limits <sup>1</sup>							
EU	Natural Gas						
	Pollutant	Hot/Warm Start	Extended Hot/Warm Start	Cold Start	Extended Cold Start	Shutdown	Protective Load Shedding
1	PM/PM <sub>10</sub> / PM <sub>2.5</sub>	0.05 lb/MMBtu					
	CO	3600 lb/event <sup>2</sup>	X lb/event <sup>3</sup>	X lb/event <sup>3</sup>	X lb/event <sup>3</sup>	600 lb/ event <sup>2</sup>	3600 lb/event <sup>4</sup>
	NH <sub>3</sub>	300 lb/event <sup>2</sup>	X lb/event <sup>3</sup>	X lb/event <sup>3</sup>	X lb/event <sup>3</sup>	300 lb/ event <sup>2</sup>	300 lb/event <sup>4</sup>
	NO <sub>x</sub>	900 lb/ event <sup>2</sup>	X lb/event <sup>3</sup>	X lb/event <sup>3</sup>	X lb/event <sup>3</sup>	900 lb/ event <sup>2</sup>	900 lb/event <sup>4</sup>
	Opacity	Opacity shall not exceed 10%, six minute block average, during all modes of start, shutdown, and protective load shedding operations.					

**Table 2B Notes:**

1. The EU 1 emission limits in Table 2B shall apply during start, shutdown, and periods of protective load shedding.
2. An "event" with respect to starts and shutdowns is a hot/warm start, extended hot/warm start, cold start, extended cold start or shutdown. The period for each event is determined by Table 6 Items 3 to 5.
3. See Table 6 Item 8.
4. The period for a protective load shedding event is determined by Table 6 Item 6.

**Table 2B Key:**

CO = Carbon monoxide  
CMR = Code of Massachusetts Regulations  
EU = Emission Unit  
lb = pound  
lb/MMBtu = pounds per million British thermal units  
NH<sub>3</sub> = Ammonia  
PM = Particulate matter, filterable portion only  
PM<sub>10</sub> = Particulate matter less than or equal to 10 microns in diameter, filterable and condensable portions  
PM<sub>2.5</sub> = Particulate matter less than or equal to 2.5 microns in diameter, filterable and condensable portions  
SO<sub>2</sub> = Sulfur dioxide  
% = percent

**B. COMPLIANCE DEMONSTRATION**

The Permittee is subject to, and shall comply with, the monitoring, testing, record keeping, and reporting requirements as contained in Tables 3, 4, and 5:

<b>Table 3</b>	
<b>EU</b>	<b>Monitoring and Testing Requirements</b>
1	1. The Permittee shall install, calibrate, and test a continuous opacity monitor (COM), continuous emission monitors (CEMS) and a data acquisition system (DAS) to measure and record the levels of oxygen, nitrogen oxides, carbon monoxide, opacity and ammonia in the flue gas of EU 1. The Permittee shall operate the COM, CEMS and DAS when firing fuel oil and operate the CEMS and DAS when firing natural gas.
	2. The Permittee shall ensure that the COM, all CEMS and recording equipment comply with MassDEP approved performance and location specifications. Notwithstanding the requirements of 40 CFR 60 Subpart GG, the equipment shall conform with the EPA monitoring specifications in 40 CFR 60.13 and 40 CFR 60 Appendices B and F, and all applicable portions of 40 CFR 72 and 75.

**Table 3**

EU	Monitoring and Testing Requirements
	<p>3. Unless specified otherwise in this Plan Approval, the Permittee shall use and maintain its COM and CEMS system as a "direct-compliance" monitor to measure opacity, NO<sub>x</sub>, CO, O<sub>2</sub> and NH<sub>3</sub>. "Direct-compliance" monitors generate data that legally documents the compliance status of a source. The MassDEP shall utilize the data generated by the "direct-compliance" monitors, MassDEP recognized emission testing or other credible evidence for compliance and enforcement purposes.</p> <p>4. When combusting fuel oil, the Permittee shall maintain the COM in an accurate operating condition and shall install, calibrate, certify, and operate the COM in accordance with 40 CFR 60 Appendix B (Performance Specifications) and apply the quality assurance and quality control procedures in 40 CFR 60 Appendix F, Procedure 3.</p> <p>5. The Permittee shall comply with all the applicable monitoring requirements in 40 CFR 72 and 75 (Acid Rain Program). The Permittee shall conduct a relative accuracy test audit (RATA) for all CEMS in accordance with the procedures in 40 CFR 60 Appendices B and F and 40 CFR 75 Appendices A and B. The Permittee shall submit a proposed RATA protocol 30 days before testing unless there are no changes from a previously submitted RATA protocol. The Permittee shall submit a final RATA report within 60 days of completion of RATA.</p> <p>6. The Permittee shall equip the COM and CEMS with audible and visible alarms. The Permittee shall set the alarms to activate when emissions are within 2% of the opacity limit and within 5% of the lb/hr emission limits in Table 2A and 2B of this Plan Approval.</p> <p>7. The Permittee shall operate the COM while firing fuel oil and shall operate each CEM while firing natural gas and fuel oil except for periods of COM and CEM calibration checks, zero and span adjustments, preventative maintenance, and periods of malfunction.</p> <p>8. The Permittee shall determine NO<sub>x</sub> and CO emissions during start, at loads below 20% when the emission rate exceeds the measurement range of the CEMs using the following formulas<sup>1</sup>:</p> $\text{NO}_x \text{ (lb/hr)} = -0.0002x^4 + 0.017x^3 + -0.3669x^2 + 4.3247x + 109.08$ $\text{CO (lb/hr)} = -2.495x^2 + 198.95x + 2260$ <p>Where x = the percent load.</p> <p>9. The Permittee shall obtain and record emission data from the COM and each CEM for at least 95% of the emission unit operating hours every calendar quarter, except for periods of COM and CEMS calibration error checks, zero and span adjustments, maintenance, and periods of malfunction.</p> <p>10. In accordance with 40 CFR 60.334 and 40 CFR 75 Appendix D Section 2.3, as appropriate, the Permittee shall monitor the sulfur content and gross calorific value of natural gas.</p> <p>11. In accordance with 40 CFR 60.334 and 40 CFR 75 Appendix D Section 2.2, as appropriate, the Permittee shall monitor the sulfur content and gross calorific value of fuel oil.</p> <p>12. In accordance with 40 CFR 75, the Permittee shall install and operate a continuous monitoring system to monitor the fuel consumption. The continuous monitoring system shall be accurate to within plus or minus 5%.</p>

**Table 3**

EU	Monitoring and Testing Requirements																
	13. The Permittee shall install and operate continuous monitors and alarm systems to monitor temperature at the inlet to the SCR and the CO catalysts.																
	14. In accordance with 40 CFR 52.21(m), the Permittee shall not be subject to pre-construction monitoring since the maximum predicted air quality impacts of the Facility are less than the Prevention of Significant Deterioration monitoring exemption levels.																
	15. The Permittee shall develop and maintain a quality assurance/quality control (QA/QC) program for the long-term operation of the CEMS which conforms to 40 CFR 60, Appendix F and all applicable portions of 40 CFR 72 and 75. The MassDEP has previously approved the QA/QC program.																
	16. The Permittee shall maintain on-site an adequate supply of spare parts for the COM and CEMS to maintain the on-line availability and data capture requirements.																
	17. Whenever the COM has not operated for three or more consecutive hours and EU 1 is firing fuel oil, the Permittee shall determine compliance with the allowable opacity limits in accordance with 40 CFR 60 Appendix A-4 Method 9 at least once per work shift during daylight hours.																
	18. The Permittee shall construct the Facility to accommodate the emissions testing requirements of this Plan Approval. All emissions testing will be conducted in accordance with the MassDEP's "Guidelines for Source Emissions Testing" and in accordance with the Environmental Protection Agency tests as specified in the 40 CFR 60, Appendix A, 40 CFR 60 Subpart GG, 40 CFR 72 and 75, or by another method which has been correlated to the above method to the satisfaction of the MassDEP.																
	19. If and when MassDEP requires it, the Permittee shall conduct emission testing in accordance with EPA Reference Test Methods and 310 CMR 7.13 Stack Testing.																
	20. The Permittee shall conduct initial compliance tests to demonstrate compliance with the emission limits (lb/hr, lb/MMBtu, ppmvd and opacity) in Table 2A for the following pollutants as determined necessary by MassDEP. Emission testing while firing natural gas shall be conducted at 100%, 75% and 50% load. Emission testing while firing fuel oil shall be conducted at 100% and 75% load.																
	<table border="1"> <thead> <tr> <th data-bbox="370 1415 875 1467">Natural Gas Firing</th><th data-bbox="875 1415 1380 1467">Fuel Oil Firing</th></tr> </thead> <tbody> <tr> <td data-bbox="370 1467 875 1520">Nitrogen oxides</td><td data-bbox="875 1467 1380 1520">Nitrogen oxides</td></tr> <tr> <td data-bbox="370 1520 875 1572">Carbon monoxide</td><td data-bbox="875 1520 1380 1572">Carbon monoxide</td></tr> <tr> <td data-bbox="370 1572 875 1625">Volatile organic compounds</td><td data-bbox="875 1572 1380 1625">Volatile organic compounds</td></tr> <tr> <td data-bbox="370 1625 875 1677">Ammonia</td><td data-bbox="875 1625 1380 1677">Ammonia</td></tr> <tr> <td data-bbox="370 1677 875 1730">Particulate matter</td><td data-bbox="875 1677 1380 1730">Particulate matter</td></tr> <tr> <td data-bbox="370 1730 875 1782">Opacity</td><td data-bbox="875 1730 1380 1782">Opacity</td></tr> <tr> <td data-bbox="370 1782 875 1829"></td><td data-bbox="875 1782 1380 1829">Sulfuric acid mist</td></tr> </tbody> </table>	Natural Gas Firing	Fuel Oil Firing	Nitrogen oxides	Nitrogen oxides	Carbon monoxide	Carbon monoxide	Volatile organic compounds	Volatile organic compounds	Ammonia	Ammonia	Particulate matter	Particulate matter	Opacity	Opacity		Sulfuric acid mist
Natural Gas Firing	Fuel Oil Firing																
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Opacity	Opacity																
	Sulfuric acid mist																

<b>Table 3</b>	
<b>EU</b>	<b>Monitoring and Testing Requirements</b>
	<p>21. The Permittee shall conduct compliance tests to demonstrate compliance with the emission limits (lb/hr, lb/MMBtu, ppmvd and opacity) in Table 2A for the following pollutants: volatile organic compounds, PM/PM<sub>10</sub>/PM<sub>2.5</sub><sup>2</sup> and sulfuric acid mist. The Permittee shall conduct the compliance tests at the minimum load at which the CEMS show that compliance with the emission limits in Table 2A for nitrogen oxides, carbon monoxide and ammonia is maintained. The Permittee shall submit a pretest protocol at least 30 days prior to testing and submit a test report within 60 days of completion of testing.</p> <p>22. The Permittee shall conduct the compliance tests required by Table 3 Item 21 no later than 180 days after the date of the notification required to be submitted to MassDEP by Table 5 Item 12.b.</p> <p>23. If the MassDEP requests additional emissions testing, the Permittee must obtain written approval of the emission testing protocol. A detailed description of sampling port locations, sampling equipment, sampling and analytical procedures, and operating conditions for such tests shall be submitted 30 days prior to testing of the Facility to the MassDEP.</p> <p>24. The Permittee shall conduct annual stratification testing for NOx and O<sub>2</sub>. Stratification testing shall be conducted in accordance with Method 20. The purpose of stratification testing is to document a representative CEMS sampling location for NOx in accordance with annual RATA testing as well as to satisfy Method 20 initial testing requirements. The requirement to perform an annual stratification test may be changed by the MassDEP, in response to a request by the Permittee, if in the opinion of the MassDEP such testing is no longer needed.</p>
Facility-wide	<p>25. The Permittee shall monitor all operations to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.</p>

**Table 3 Notes:**

1. See the letter from Mark D. Winnie to Thomas Cusson of February 28, 2003.
2. The Permittee shall test PM by using EPA Method 5 for PM or EPA Method 201A for PM<sub>10</sub> and EPA Method 202 for condensable particulate matter, adding those emissions, and comparing that sum to the PM/PM<sub>10</sub>/PM<sub>2.5</sub> emission limit.

**Table 3 Key:**

CEMS = Continuous Emission Monitors  
CFR = Code of Federal Regulations  
CMR = Code of Massachusetts Regulations  
CO = Carbon monoxide  
COM = Continuous Opacity Monitor  
DAS = Data Acquisition System  
EPA = Environmental Protection Agency  
NH<sub>3</sub> = Ammonia  
NOx = Nitrogen oxides  
O<sub>2</sub> = Oxygen  
PM = Particulate matter, filterable portion only  
PM<sub>10</sub> = Particulate matter less than or equal to 10 microns in diameter, filterable and condensable portions

PM<sub>2.5</sub> = Particulate matter less than or equal to 2.5 microns in diameter, filterable and condensable portions  
RATA = Relative accuracy test audit  
SCR = Selective catalytic reduction  
SO<sub>2</sub> = Sulfur dioxide  
VOC = Volatile organic compounds  
% = percent

<b>Table 4</b>	
<b>EU</b>	<b>Record Keeping Requirements</b>
1	1. In accordance with 40 CFR 52.21(r)(6)(iii) and 310 CMR 7.00: Appendix A(2)(b), the Permittee shall calculate and maintain a record of annual emissions, in tons per year on a calendar basis, for a period of 10 years following resumption of regular operations after installation of LLTD and SPAG.
	2. The Permittee shall count any period of excess emission of CO as a period of excess emission of VOC, and the excess emission of VOC shall be counted towards the tons per year emission limit for VOC in Table 2A.
	3. The Permittee shall keep the following records on site for the life of the Facility: a. output from all continuous emission monitors for flue gas emissions, b. fuel consumption, c. SCR and CO control system inlet temperatures, and d. EU 1 inlet and ambient temperatures and shall make these records available to the MassDEP on request.
	4. The Permittee shall maintain a log to record each period that fuel oil is fired in EU 1. The log shall indicate the date, duration of firing, amount of fuel oil fired, and name of the operator making the entry.
	5. The Permittee shall record emission data obtained from each CEM as required by Table 3 Item 9.
	6. The Permittee shall record the fuel consumption as required by Table 3 Item 12.
	7. The Permittee shall maintain records to demonstrate compliance with Table 6 Item 16.
Facility-wide	8. The Permittee shall maintain adequate records on-site to demonstrate compliance status with all operational, production, and emission limits contained in Table 2A and 2B above. Records shall also include the actual emissions of air contaminants emitted for each calendar month and for each consecutive twelve-month period. These records shall be compiled no later than the 15 <sup>th</sup> day following each month. An electronic version of the MassDEP approved record keeping form, in Microsoft Excel format, can be downloaded at: <a href="http://www.mass.gov/eea/agencies/massdep/air/approvals/limited-emissions-record-keeping-and-reporting.html#WorkbookforReportingOn-SiteRecordKeeping">http://www.mass.gov/eea/agencies/massdep/air/approvals/limited-emissions-record-keeping-and-reporting.html#WorkbookforReportingOn-SiteRecordKeeping</a> .
	9. The Permittee shall include the quantification of all periods of excess emissions, including those attributable to an emergency or malfunction and start, shutdown, protective load shedding or equipment cleaning, in the determination of twelve-month period emissions and any determination of compliance with the tpy emission limits in Table 2A and 2B of this Plan Approval.
	10. The Permittee shall maintain a record of routine maintenance activities performed on the approved EUs, PCDs and monitoring equipment. The records shall include, at a minimum, the type or a description of the maintenance performed and the date and time the work was completed.

<b>Table 4</b>	
<b>EU</b>	<b>Record Keeping Requirements</b>
	11. The Permittee shall maintain a record of all malfunctions affecting air contaminant emission rates on the approved EUs, PCDs and monitoring equipment. At a minimum, the records shall include: date and time the malfunction occurred; description of the malfunction; corrective actions taken; the date and time corrective actions were initiated and completed; and the date and time emission rates and monitoring equipment returned to compliant operation.
	12. The Permittee shall maintain all operating and monitoring records and logs <u>for the life</u> of the Facility.
	13. In accordance with 40 CFR 60.334 and 40 CFR 75 Appendix D Section 2, as applicable, the Permittee shall maintain records of the sulfur content and gross calorific value of natural gas and fuel oil that is required to be monitored in Table 3 Items 10 and 11.
	14. The Permittee shall comply with all applicable record keeping requirements in 40 CFR 60, 72, 73, 75 and 77.
	15. The Permittee shall maintain records of monitoring and testing required by Table 3.
	16. The Permittee shall maintain a copy of this Plan Approval, the underlying Application and the most up-to-date SOMP for the EUs and PCDs approved herein on-site.
	17. The Permittee shall maintain records to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.
	18. Unless otherwise specified, the Permittee shall maintain records required by this Plan Approval on-site for a minimum of five (5) years.
	19. The Permittee shall make records required by this Plan Approval available to MassDEP and EPA personnel upon request.

**Table 4 Key:**

CO = Carbon monoxide  
CFR = Code of Federal Regulations  
CMR = Code of Massachusetts Regulations  
CEM = Continuous Emission Monitor  
EU = Emission Unit  
LLTD = Low Load Turn Down  
PCD = Pollution Control Device  
SCR = Selective catalytic reduction  
SOMP = Standard Operation and Maintenance Plan  
SPAG = Steam Power Augmentation

<b>Table 5</b>	
<b>EU</b>	<b>Reporting Requirements</b>
1	1. In accordance with 40 CFR 52.21(r)(6)(iv) and 310 CMR 7.00: Appendix A(2)(b), the Permittee shall submit a report to MassDEP within 60 days of the end of each calendar year for which records are generated under Table 4 Item 1.
	2. In accordance with the requirements of 310 CMR 7.14(1) as described in the letter to Millennium Power Partners, LP from Christine Kirby, Director Air and Climate Programs, Bureau of Air and Waste, MassDEP dated May 29, 2015, the Permittee shall report NOx mass emissions data and heat input data to the USEPA, Clean Air Markets Division. The Permittee shall submit an Ozone Season Net Output Report to MassDEP by December 1 each year until notified otherwise. The Ozone Season Net Output Report shall include both net electrical output in megawatt-hours and net thermal output in million British thermal units. MassDEP may revoke or change this reporting requirement by further communication or by regulation.
	3. The Permittee shall submit a quarterly report in writing and in digital format, in a format acceptable to MassDEP, to the Department of Environmental Protection, Central Regional Office, Bureau of Air and Waste, 8 New Bond Street, Worcester, Massachusetts, 01606. The report will be submitted by the end of the following month and will contain at least the following information: <ul style="list-style-type: none"> <li>a. CEMS and COM periods of excess emissions,</li> <li>b. for each period of excess emissions or excursions from allowable operating conditions, the Permittee shall list the duration, cause, the response taken, and the amount of excess emissions (in pounds). Periods of excess emissions shall include periods of start, shutdowns, protective load shedding, malfunction, emergency, equipment cleaning, and upsets or failures associated with the emission control system or CEMS,</li> <li>c. a tabulation of periods of operation, including the time of the beginning and ending of start, shutdown, and protective load shedding,</li> <li>d. for each period during which there was any firing of fuel oil, the quarterly report will include the date of fuel oil firing, the amount of fuel oil fired, the reasons and duration of firing. This report will summarize year-to-date the number of hours of fuel oil firing and the total amount of fuel oil fired, and,</li> <li>e. a tabulation of each extended start and shutdown with the reason for the extension. Periods of start or shutdown or extended start or shutdown that meet the requirements of Table 6 Items 3 - 5 are not considered deviations from allowable operating conditions.</li> </ul>
	4. The Permittee shall provide the name, location, e-mail address (if any), telephone number and facsimile transmission number (if any) of the designated representative (DR) to the town of Charlton, to the MassDEP and to any other person who so requests it. The Permittee shall keep the DR contact information current at all times.
	5. The Permittee shall submit a final test report of emission testing that is required by Table 3 Items 19 and 20 within 60 days of completion of the emission testing to the MassDEP.

Table 5	
EU	Reporting Requirements
Facility-wide	6. The Permittee shall submit to MassDEP all information required by this Plan Approval over the signature of a “Responsible Official” as defined in 310 CMR 7.00 or a designee appointed by a Responsible Official and shall include the Certification statement in 310 CMR 7.01(2)(c).
	7. The Permittee shall provide notice of an emergency <sup>1</sup> or malfunction <sup>2</sup> that: <ul style="list-style-type: none"> <li>a. causes emissions to the ambient air that exceed any emission limits, including noise limits, in this Plan Approval, or</li> <li>b. causes the release or threat of a release of ammonia and/or upsets or malfunctions to the ammonia handling or delivery systems, or</li> <li>c. causes a condition of air pollution</li> </ul> to the Central Regional Office of MassDEP, BAW Permit Chief by telephone: 508-767-2845, email: roseanna.stanley@state.ma.us and CERO.Air@state.ma.us, or fax: 508-792-7621, <b>within four hours</b> (or as soon as reasonably practical) after discovery of the emergency or malfunction and in writing within two (2) business days after discovery of the emergency or malfunction. If the initial notice is not provided within four (4) hours of discovery, then the Permittee shall have the burden of establishing that the initial notice was provided as soon as reasonably practical in any subsequent enforcement action.
	8. The Permittee shall notify the Boards of Health in the Towns of Charlton and Southbridge as soon as reasonably practical of the emergency or malfunction and shall send both Towns a copy of any written notice made to the MassDEP to these Boards of Health.
	9. The written notice must contain a description of the emergency or malfunction, identification of the exceedance(s), duration of the exceedance(s), reason for the exceedance(s), any steps taken to mitigate emissions, an estimate of the quantity of emissions released because of the emergency or malfunction, any corrective actions taken and action plan to prevent future exceedance(s).
	10. The Permittee must comply with all notification procedures required under M.G.L. c. 21E, Spill Notification Regulations.
	11. The reporting requirements of this Plan Approval for an emergency or malfunction do not supersede, limit, or make inapplicable any reporting obligation under federal law, including but not limited to 42 U.S.C. sections 9603 or 11004.
	12. The Permittee shall notify MassDEP in writing within five (5) days each of the following becoming ready for commercial operation: <ul style="list-style-type: none"> <li>a. steam power augmentation, and</li> <li>b. operation at less than 50% load.</li> </ul>
	13. The Permittee shall comply with all applicable reporting requirements in 40 CFR 60, 72, 73, 75 and 77.
	14. The Permittee shall report annually to MassDEP, in accordance with 310 CMR 7.12, all information as required by the Source Registration/Emission Statement Form.

<b>Table 5</b>	
<b>EU</b>	<b>Reporting Requirements</b>
	15. The Permittee shall submit any records or reports required to be submitted to the MassDEP in writing and in digital format in a format acceptable to the MassDEP.

**Table 5 Notes:**

1. "Emergency" means any situation arising from sudden and reasonably unforeseeable events beyond the control of this source, including acts of God, which would require immediate corrective action to restore normal operation, and that causes the source to exceed a technology based limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operations, operator error or decision to keep operating despite knowledge of these things.
2. "Malfunction" means any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation, or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

**Table 5 Key:**

BAW = Bureau of Air and Waste  
CFR = Code of Federal Regulations  
CMR = Code of Massachusetts Regulations  
CEMS = Continuous Emission Monitors  
COM = Continuous Opacity Monitor  
U.S.C. = United States Code  
USEPA = United States Environmental Protection Agency

#### **4. SPECIAL TERMS AND CONDITIONS**

- A. The Permittee is subject to, and shall comply with, the Special Terms and Conditions as contained in Table 6 below:

<b>Table 6</b>	
<b>EU</b>	<b>Special Terms and Conditions</b>
1	<ol style="list-style-type: none"> <li>1. The Permittee shall keep emission rates from the Facility at the lowest practical level at all times, but shall not exceed the emission limits specified in Table 2A and 2B of this Plan Approval.</li> <li>2. The Permittee shall not operate EU 1 on fuel oil at less than 75% load except during start, shutdown, periods of protective load shedding and switching between fuels.</li> </ol>

Table 6	
EU	Special Terms and Conditions
	3. The Permittee shall not allow a hot/warm start <sup>1</sup> operation to exceed 180 minutes except that the hot/warm start period may be extended for no more than an additional 180 minutes (Extended Hot/Warm Start) if the additional time is minimized in accordance with prudent operational and maintenance practices. Should the hot/warm start be extended, the Permittee shall report the extension and the reasons for it in accordance with the reporting requirements in Table 5 of this Plan Approval.
	4. The Permittee shall not allow a cold start <sup>2</sup> operation to exceed 240 minutes except that the cold start period may be extended for no more than an additional 240 minutes (Extended Cold Start) if the additional time is minimized in accordance with prudent operational and maintenance practices. Should the cold start be extended, the Permittee shall report the extension and the reasons for it in accordance with the reporting requirements in Table 5 of this Plan Approval.
	5. The Permittee shall not allow a shutdown <sup>3</sup> operation to exceed 120 minutes. Should the shutdown be extended beyond 120 minutes, the Permittee shall report the extension and the reasons for it in accordance with the reporting requirements in Table 5 of this Plan Approval.
	6. The Permittee shall not allow a period of protective load shedding <sup>4</sup> to exceed 240 minutes.
	7. The Permittee shall comply with the start, shutdown and protective load shedding emission limits in Table 2B when operating on natural gas.
	8. No later than January 26, 2017, the Permittee shall recommend emission limits while firing natural gas to MassDEP for extended hot/warm start, cold start and extended cold start.
	9. The Permittee shall fire only No. 1 fuel oil, except the Permittee may fire No. 2 fuel oil if additional compliance testing is to be conducted within 30 days of firing No. 2 fuel oil. The Permittee may continue to fire No. 2 fuel oil if the additional compliance testing demonstrates EU 1 complies with the applicable lb/hr, lb/MMBtu and ppmvd emission limitations in Table 2A.
	10. The Permittee shall recommend start, shutdown and protective load shedding emission limits while firing fuel oil to MassDEP within one year of the beginning of commercial operation while firing fuel oil. The Permittee may request MassDEP to extend the one year period if the available data are inadequate to determine start and shutdown emission limits while firing fuel oil.
	11. Periods of extended start that meet the requirements of Table 6 Items 3 - 5 are not considered permit deviations.
	12. The Permittee shall not burn fuel oil from May 1 through September 30, inclusive, of any calendar year, except during initial compliance testing, initial plant demonstration and performance testing, periodic readiness testing, when natural gas is unavailable, or in the event of the unavailability of natural gas at commercially reasonable prices provided it does not exceed the operational/production limit of 720 hours as noted Table 2A.
	13. The Permittee shall operate on natural gas except when natural gas is unavailable or is unavailable at commercially reasonable prices.

<b>Table 6</b>	
<b>EU</b>	<b>Special Terms and Conditions</b>
	<p>14. The Permittee shall ensure that the NOx SCR and CO catalyst for EU 1 are operational as soon as the flue gas temperature at the inlet to the SCR and CO catalyst is above the minimum flue gas temperature specified by the equipment manufacturers and other system parameters are satisfied for SCR and CO catalyst operation.</p> <p>15. The Permittee shall demonstrate continuous compliance with the VOC emission limits in Table 2A by direct mathematical relationship with appropriate CO emissions as determined for the Facility.</p> <p>16. The Permittee may re-use fuel oil that becomes "used fuel oil" during fuel oil firing and associated maintenance operations. Used fuel oil shall only be generated from on site activities. Oil to be used for burning in the EU 1 shall contain no more than 1% used fuel oil. No more than 10,000 gallons of used fuel oil may be in the oil storage tank at any time.<sup>5</sup></p>
Facility-wide	<p>17. The Permittee shall not be automatically shielded from enforcement action brought for noncompliance with emission limitations specified in this permit because of an "emergency" and/or "malfunction." Emergency and malfunction are defined in the Table Notes to Table 5.</p> <p>18. In any enforcement proceedings, the Permittee has the burden of proof in establishing the occurrence of an emergency or malfunction.</p> <p>19. If an emergency episode requires immediate notification to any government agencies, the Permittee shall make timely notification to the appropriate parties as required by law.</p> <p>20. The Permittee shall not be shielded from enforcement for any emission exceedance that would result in a predicted exceedance of any health based air quality standards.</p> <p>21. The Permittee shall design, construct, operate and maintain the Facility such that at all times:</p> <ol style="list-style-type: none"> <li>no condition of air pollution will be caused by emissions of sounds as provided in 310 CMR 7.01, and</li> <li>no sound emissions resulting in noise will occur as provided in 310 CMR 7.10 and the MassDEP Policy 90-001 and the Energy Facilities Siting Board committed levels, whichever is more restrictive.</li> </ol>
	<p>22. On receiving information the Facility may be in non-compliance with the provisions of this Plan Approval regarding sound emission levels, the Permittee shall immediately take the following actions:</p> <ol style="list-style-type: none"> <li>take all reasonable interim steps to eliminate or minimize sound emissions and to return to compliance,</li> <li>investigate immediately the cause of sound emissions and develop a plan to mitigate sound emission levels if deemed in non-compliance,</li> <li>notify the MassDEP Central Regional Office, Bureau of Air and Waste immediately on receipt of information that the Facility may be in non-compliance and propose a plan and schedule to mitigate the source of sound emissions, and</li> <li>on completion of the proposed mitigation, the Permittee will submit a final report of mitigation to the MassDEP.</li> </ol>
	<p>23. Should noncompliance with this Plan Approval or the MassDEP regulations as a result of sound</p>

<b>Table 6</b>	
<b>EU</b>	<b>Special Terms and Conditions</b>
	<p>emissions from the Facility continue despite the steps implemented as a result of Table 6 Item 22 above, the Permittee shall, unless otherwise ordered by the MassDEP, submit within 30 days of receipt of information of noncompliance from the MassDEP or other credible source, whichever is earlier, a sound reduction plan for MassDEP written approval. The sound reduction plan shall include the additional monitoring and remedial actions the Permittee proposes to implement in order to return to compliance and verify the return to compliance, and a schedule for the commencement and completion of each major component of the sound reduction plan.</p> <p>Except as otherwise ordered by the MassDEP, the schedule for completion of the sound reduction plan shall not exceed thirty (30) days from the MassDEP's approval of the sound reduction plan, or applicable part(s) thereof, unless the Permittee adequately demonstrates that the work cannot be completed within thirty days by using its best efforts. In reviewing a best efforts demonstration, the MassDEP will not consider delays that could have been reasonably avoided had the Facility been designed and constructed in a manner to facilitate the timely completion of the proposed remedial actions, including, for example, installation of additional sound reduction equipment, sound containment structures or other sound barriers.</p> <p>If the remedial actions are not completed in accordance with the sound reduction plan approved by the MassDEP and there is continuing noncompliance with the sound emission levels established in this Plan Approval or in regulation, then the Permittee shall, unless otherwise ordered by the MassDEP, modify the operations of the Facility in order to return to compliance. Such actions shall include, as necessary, reduction of the Facility's operating capacity, restriction of its hours of operations, or suspension of operations. The modifications shall commence on the first day beyond the established sound reduction plan completion date and continue until the operator certifies in writing to the MassDEP that all the remedial actions are completed.</p> <p>Nothing in this Plan Approval shall be interpreted to restrict, limit or in any way impair the MassDEP's authority to institute such administrative or judicial enforcement actions as it deems necessary in response to noncompliance with the terms and provisions of this Plan Approval or the MassDEP's regulations.</p>
	<p>24. The Permittee shall seek an amendment to this Plan Approval for any modifications to the Facility's property line by sale, agreement or other transaction as it may influence noise levels. The MassDEP reserves the right to require additional noise mitigation measures or such actions as it deems necessary to ensure compliance with the MassDEP's Air Pollution Control Regulations.</p>
	<p>25. The Permittee shall properly train all personnel to operate the Facility and pollution control devices in accordance with vendor specifications. All persons responsible for the operation of the ammonia handling and SCR control systems shall sign a statement affirming that they have read and understand the approved standard operating and standard maintenance procedures. The Permittee shall conduct refresher training at least once annually.</p>

<b>Table 6</b>	
<b>EU</b>	<b>Special Terms and Conditions</b>
	26. The Permittee shall maintain, in the Facility control room, portable ammonia detectors for use during a spill or atmospheric release. The Permittee shall calibrate the portable ammonia monitors at least once per year or at the frequency recommended by the ammonia detector manufacturer.
	27. The Permittee shall maintain high and low ammonia tank level indicators. The ammonia tank level indicators shall be equipped with an audible alarm that sounds in the control room and near the ammonia tank. The high and low level ammonia tank level indicators set points shall be set to warn operators at 90% full at the high level and within 10% of empty.
	28. The Permittee shall periodically maintain, test and calibrate the ammonia tank level alarm system as recommended by the manufacturer.
	29. The Permittee shall empty, clean and inspect the ammonia tank, using appropriately trained personnel, at the interval recommended by the tank manufacturer.
	30. The Permittee shall store the standard operating and maintenance procedures for the ammonia handling system in a convenient location (such as the control room and/or the technical library) and make them readily available to all employees.
	31. The Permittee shall pave and maintain Facility site access roadways and onsite traffic areas to prevent dust emissions at all times.
	32. This Plan Approval, Tr. No. X272799 supersedes Plan Approvals Tr. Nos. X265042 issued on October 26, 2016, 130921 issued on January 29, 1998 and 130921(A), issued on March 16, 2005, in their entirety, with the exception that all plan application materials submitted as part of the Plan Approvals Tr. Nos. X265042, 130921 and 130921(A) become part of this Plan Approval, Tr. No. X272799.

**Table 6 Notes:**

1. A "hot/warm start" is a start that is defined as the time from the initiation of combustion to the time 50% load is achieved when firing natural gas or 75% load is achieved when firing fuel oil (a) when EU 1 has had more than 120 minutes flame time in the 24 hours before the initiation of combustion, or (b) when switching between fuels while EU 1 is operational.
2. A "cold start" is a start that is defined as the time from the initiation of combustion to the time 50% load is achieved when firing natural gas or 75% load is achieved when firing fuel oil when EU 1 had 120 minutes or less of flame time in the 24 hours before the initiation of combustion.
3. A "shutdown" is defined as the time from operator initiated shutdown or unit protective trip to "no flame."
4. "Protective load shedding" is defined as an event during which a Facility operational parameter is out of specification and the Permittee reduces EU 1's load to less than 50% load while firing natural gas or 75% while firing fuel oil without stopping the combustion process to protect the combustion turbine from damage.
5. See the letter from Thomas P. Cusson to Millennium Power Partners, LP of August 26, 2005.

**Table 6 Key:**

CO = Carbon monoxide  
CMR = Code of Massachusetts Regulations  
EU = Emission Unit  
NOx = Nitrogen oxides  
ppmvd = parts per million by volume, dry basis  
lb/hr = pounds per hour  
lb/MMBtu = pounds per million British thermal units  
SCR = Selective catalytic reduction  
tpy = tons per 12 month rolling period  
VOC = Volatile organic compounds  
% = percent

- B. The Permittee shall install and use an exhaust stack, as required in Table 7, on each of the Emission Units that is consistent with good air pollution control engineering practice and that discharges so as to not cause or contribute to a condition of air pollution. Each exhaust stack shall be configured to discharge the gases vertically and shall not be equipped with any part or device that restricts the vertical exhaust flow of the emitted gases, including, but not limited to, rain protection devices known as “shanty caps” and “egg beaters.”
- C. The Permittee shall install and utilize exhaust stacks with the following parameters, as contained in Table 7, for the Emission Units that are regulated by this Plan Approval:

<b>Table 7</b>				
<b>EU</b>	<b>Stack Height Above Ground (feet)</b>	<b>Stack Inside Exit Dimensions (feet)</b>	<b>Nominal Stack Gas Exit Velocity Range<sup>1</sup> (feet per second)</b>	<b>Nominal Stack Gas Exit Temperature Range<sup>1</sup> (°F)</b>
1	225	19	29-89	173-242
2	52	35	NA	NA

**Table 7 Notes:**

- Nominal Stack Gas Exit Velocity Range and Nominal Stack Gas Exit Temperature Range are exclusive of start, shutdown and periods of protective load shedding.

**Table 7 Key:**

EU = Emission Unit  
°F = degree Fahrenheit  
NA = Not applicable

## **5. GENERAL CONDITIONS**

The Permittee is subject to, and shall comply with, the following general conditions:

- A. Pursuant to 310 CMR 7.01, 7.02, 7.09 and 7.10, should any nuisance condition(s), including but not limited to smoke, dust, odor or noise, occur as the result of the operation of the Facility, then the Permittee shall immediately take appropriate steps including shutdown, if necessary, to abate said nuisance condition(s).
- B. If asbestos remediation/removal will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that all removal/remediation of asbestos shall be done in accordance with 310 CMR 7.15 in its entirety and 310 CMR 4.00.
- C. If construction or demolition of an industrial, commercial or institutional building will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that said construction or demolition shall be done in accordance with 310 CMR 7.09(2) and 310 CMR 4.00.
- D. Pursuant to 310 CMR 7.01(2)(b) and 7.02(7)(b), the Permittee shall allow MassDEP and / or USEPA personnel access to the Facility, buildings, and all pertinent records for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.
- E. This Plan Approval does not negate the responsibility of the Permittee to comply with any other applicable Federal, State, or local regulations now or in the future.
- F. Should there be any differences between the Application and this Plan Approval, the Plan Approval shall govern.
- G. Pursuant to 310 CMR 7.02(3)(k), MassDEP may revoke this Plan Approval if the construction work is not commenced within two years from the date of issuance of this Plan Approval, or if the construction work is suspended for one year or more.
- H. This Plan Approval may be suspended, modified, or revoked by MassDEP if MassDEP determines that any condition or part of this Plan Approval is being violated.
- I. This Plan Approval may be modified or amended when in the opinion of MassDEP such is necessary or appropriate to clarify the Plan Approval conditions or after consideration of a written request by the Permittee to amend the Plan Approval conditions.
- J. Pursuant to 310 CMR 7.01(3) and 7.02(3)(f), the Permittee shall comply with all conditions contained in this Plan Approval. Should there be any differences between provisions

contained in the General Conditions and provisions contained elsewhere in the Plan Approval, the latter shall govern.

## **6. MASSACHUSETTS ENVIRONMENTAL POLICY ACT**

MassDEP has determined that the filing of an Environmental Notification Form (ENF) with the Secretary of Energy & Environmental Affairs, for air quality control purposes, was not required prior to this action by MassDEP. Notwithstanding this determination, the Massachusetts Environmental Policy Act (MEPA) and 301 CMR 11.00, Section 11.04, provide certain “Fail-Safe Provisions,” which allow the Secretary to require the filing of an ENF and/or an Environmental Impact Report (EIR) at a later time.

## **7. APPEAL PROCESS**

This Plan Approval is an action of MassDEP. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date of issuance of this Plan Approval.

Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts, which are the grounds for the request, and the relief sought. Additionally, the request must state why the Plan Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars (\$100.00) must be mailed to:

Commonwealth of Massachusetts  
Department of Environmental Protection  
P.O. Box 4062  
Boston, MA 02211

This request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

MassDEP may waive the adjudicatory hearing-filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

Enclosed is a stamped approved copy of the application submittal.

Should you have any questions concerning this Plan Approval, please contact Stephen Majkut by telephone at 508-767-2773, e-mail at [stephen.majkut@state.ma.us](mailto:stephen.majkut@state.ma.us), or in writing at the letterhead address.

*This final document copy is being provided to you electronically by the  
Department of Environmental Protection. A signed copy of this document  
is on file at the DEP office listed on the letterhead.*

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Roseanna E. Stanley  
Permit Chief  
Bureau of Air and Waste

Enclosure

ecc:     Charlton Board of Health  
          Southbridge Board of Health  
          Charlton Fire Department  
          Southbridge Fire Department  
          MassDEP/Boston - Yi Tian  
          MassDEP/CERO – Kim McCoy  
          Debby Cartney, Berkshire Environmental Consultants, Inc.

## **Appendix**

### **HISTORY**

On January 29, 1998 the Department of Environmental Protection issued a "Conditional Plan Approval" (Tr. No. 130921) to Millennium Power Partners LP ("the Permittee") to construct a combined cycle electric power generating facility of approximately 360 MW nominal output at 10 Sherwood Lane in Charlton, Massachusetts. This Plan Approval allowed construction of the facility to begin. The Conditional Approval combined and included: 310 CMR 7.02(2) Comprehensive Plan Approval; 310 CMR 7.00: APPENDIX A: Emission Offsets and Non-Attainment Review Approval; and 40 CFR 52 Prevention of Significant Deterioration ("PSD") Approval. The Facility was also subject to the requirements of the Massachusetts Environmental Policy Act ("MEPA") MGL Chapter 30, Sections 61-62H. On November 21, 1997, the Secretary of Environmental Affairs issued a certificate that the Final Environmental Impact Report adequately complied with the Act and the Regulations governing the preparations of the Environmental Impact Report. The Conditional Plan Approval also contained Section 61 finding as required by MGL Chapter 30.

The Conditional Plan Approval required the Permittee to submit final plans and specifications to the MassDEP for review prior to commencement of operations. The Facility complied with these requirements and on March 3, 2000, the MassDEP issued a "Final 7.02 Air Quality Plan Approval" (Tr. No. 130921) to commence operation of the Facility at the proposed site location and subject to the conditions and provisions as stated.

The Final Plan Approval was issued under 310 CMR 7.02 and was limited to the applicable air pollution control regulations. The Final Plan Approval contained information from the Conditional Plan Approval including a project description, emission control systems identification and facility emission and operating limits. The Final Plan Approval to commence operations did not alter the emission limits, facts of the offset or non-attainment review, facility description, emission controls, fuel of use, model results, Title IV requirements, NSPS requirements or PSD Approval as set in the Conditional Plan Approval dated January 29, 1998. The Final Plan Approval established emission test requirements, CEM requirements, optimization testing procedures, record keeping and reporting requirements and special conditions as deemed necessary by the Department of Environmental Protection to ensure the Facility complies with the air pollution control regulations.

Subsequent to commencement of operations, the Facility experienced significant equipment problems that prevented any sustained commercial operations for a considerable period. As a result, the Permittee was in jeopardy of not meeting certain obligations required in the Final Plan Approval including meeting compliance test dates and development of certain emission data. On September 21, 2001, the Permittee and the MassDEP entered into an Administrative Consent Order (ACO-CE-9003-7) that addressed the various issues. That Order was amended and extended on two occasions. The Order expired on December 31, 2002. A new Administrative

Consent Order (ACO-CE-03-7001) was executed on February 28, 2003 addressing remaining issues about start and shutdown operations.

It was discovered that it takes substantially longer to conduct a start than originally anticipated and approved. This does not significantly impact emissions from the Facility or compliance with ambient air quality standards. Optimized emission limits during start and shutdown while burning natural gas have been identified. Air quality modeling has been done using emission rates determined during startup and shutdown and it was demonstrated that air quality standards are being met and maintained during startup and shutdown operations. To date, the Facility has not operated commercially on fuel oil. In order to develop start and shutdown emissions for commercial fuel oil operations, the Facility has one year from the commencement of commercial operations on fuel oil (i.e., operation on fuel oil for purposes other than shakedown, testing, and maintenance), to submit to the MassDEP for review and approval startup and shut down emission rates during commercial fuel oil operation. Recognizing that fuel oil starts and shutdowns may be very infrequent, even after the commencement of commercial operations on fuel oil, if inadequate data are available due to a small number of startups and shutdowns or if other factors warrant, the MassDEP will consider allowing a longer data collection period.

The Permittee conducted emission optimization tests (see the letter to MassDEP of November 27, 2002) to determine the lowest achievable emission rates for carbon monoxide and the best emission rates for nitrogen oxides and ammonia from EU 1, including starts and shutdowns, that are achievable by the technology as installed.

During the first year of operation, the Permittee monitored the emissions of NO<sub>x</sub>, CO and ammonia with CEMS and monitored opacity with a COM during all start and shutdown periods. Emission data and recommendations generated from this monitoring were submitted for review to the MassDEP and were reflected in the Final Plan Approval (Tr. No. 130921) and subsequent plan approvals.

The Permittee submitted a report to MassDEP on October 5, 2000 that evaluated the technical feasibility, risk factors and cost of implementing means to eliminate or reduce the transportation into and storage of aqueous ammonia at the Facility.

The emission limits in the original Conditional Plan Approval set specific limits under both gas turbine operational loads and ambient temperatures. This led to a complex matrix of possible emission limits during any moment of operations. The March 16, 2005 Plan Approval (Tr. No. 130921(A)) simplified the emission limit table by using only the maximum emission rates that would be allowed under various gas turbine load rates regardless of ambient temperature. Annual emission limits were not altered by any of these changes or additions to the amended Plan Approval because emissions during all modes of operations were included in the rolling totals. Plan Approval Tr. No. 130921(A) also included start and shutdown emission limits, as intended by ACO-CE-03-7001.

## CUMULATIVE AIR IMPACT OF EXISTING AND PROPOSED MAJOR SOURCES

- A. In accordance with the Department of Environmental Protection's modeling protocol, a cumulative air impact analysis was performed prior to the issuance of the Conditional Approval. Existing and potential new major sources of air pollution within the areas defined by two concentric circles with radii of 10 and 20 kilometers were modeled. Modeling showed that the combined impacts, plus background, do not exceed applicable air quality standards. The analysis evaluated the following criteria pollutants: particulate matter, sulfur dioxide, nitrogen oxides, and carbon monoxide.
- B. Modeling was performed with a 225-foot stack height. The refined modeling techniques included the use of ISCST3 for all terrain. The meteorological data used for refined modeling consisted of five years of surface observations (1990-1994) collected by the National Weather Service at Worcester Airport and Bradley International Airport in Windsor Locks, Connecticut.
- C. A summary of modeled load conditions, maximum concentrations, the NAAQS and the Significant Impact Levels are presented in the table below.

Maximum Predicted Refined ISCST3 results for 225 foot stack					
Pollutant	Averaging Time	Significant Impact Level ( $\mu\text{g}/\text{m}^3$ )	Maximum Concentrations ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )	Worst Case Load
SO <sub>2</sub>	3-Hour	25	21.18	1,300	75% fuel oil (0°F)
	24-Hour	5	4.43	365	100% fuel oil (0°F)
	Annual	1	0.58	80	100% fuel oil (0°F)
PM-10	24-Hour	5	4.25	150	100% fuel oil (0°F)
	Annual	1	0.56	50	100% fuel oil (0°F)
NO <sub>2</sub>	Annual	1	0.39	100	100% fuel oil (0°F)
CO	1-Hour	2,000	100.8	40,000	50% natural gas (60°F)
	8-Hour	500	70.5	10,000	50% natural gas (60°F)

**Key:**

CO = Carbon monoxide  
ISCST3 = Industrial Source Complex Short Term Dispersion Model  
NAAQS = National Ambient Air Quality Standards  
NO<sub>x</sub> = Nitrogen oxides  
PM-10 = Particulate matter less than 10 microns in aerodynamic diameter  
SO<sub>2</sub> = Sulfur dioxide  
°F = degrees Fahrenheit  
 $\mu\text{g}/\text{m}^3$  = micrograms per cubic meter

- D. The non-criteria pollutants evaluated include both Hazardous Air Pollutants (HAP) as defined in Title III of the 1990 Clean Air Act Amendments, and "air toxics" regulated by MassDEP policy. For air toxics, the MassDEP has developed Threshold Effects Exposure Limits (TEL) and annual average Allowable Ambient Limit (AAL) values.
- E. Predicted ambient air concentrations of air toxics were determined by refined modeling for formaldehyde, sulfuric acid mist, and ammonia. All predicted impacts are below the TEL and AAL values.
- F. The predicted annual air toxics concentrations were based on 720 hours per year of fuel oil firing, with the exception of ammonia and formaldehyde, which were based on a full year of gas firing (worst case condition). The predicted concentrations for air toxic materials from the Facility stack are below TELs and AALs in all cases.
- G. The vaporization and dispersion of an accidental release of ammonia was modeled. Receptors were located at the fence line, the property boundary line, and the public road nearest to the ammonia storage tank. Maximum predicted concentrations of ammonia were below the Immediately Dangerous to Life or Health value at the fence line.

## **EMISSION OFFSETS AND NON-ATTAINMENT REVIEW**

- A. The Commonwealth's Air Pollution Control Regulations, 310 CMR 7.00, Appendix A also require the application of the Lowest Achievable Emission Rate (LAER) and emission offsets for stationary sources with potential nitrogen oxides (NOx) emissions of 50 tons per year or more located in serious ozone non-attainment areas.
- B. The entire Commonwealth of Massachusetts, which includes the Town of Charlton, was designated non-attainment for the pollutant ozone at the time of the original application. Non-attainment review applied for this project since potential emissions of NOx are above the "major source" threshold of 50 tons per year, as defined in 310 CMR 7.00 Appendix A. NOx emissions are precursors to the formation of ozone and are therefore regulated pursuant to 310 CMR 7.00, Appendix A. Applicable requirements for the proposed then new major stationary source of NOx required the Permittee to meet LAER and obtain emission offsets. The MassDEP determined in the Conditional Plan Approval that NOx LAER for the combustion turbine is an emission limit of 3.5 ppmvd corrected to 15% O<sub>2</sub>.
- C. Rules for obtaining offsets in Massachusetts are set forth in 310 CMR 7.00 Appendix A and Appendix B. Offsets for major sources under Appendix A are required at a minimum ratio of 1.2 to 1.
- D. The Offset requirement for this Facility under Appendix A can be met by withdrawing MassDEP-certified Emission Reduction Credits (ERCs). Emission reduction credits can come from shutting down an existing source, or curtailing its operation, or by "over-controlling" an existing source. In all cases, offsets must be real, surplus, permanent,

quantifiable, and federally enforceable. The MassDEP will also accept NO<sub>x</sub> offsets created by qualifying activities in certain other states provided that the MassDEP has executed a memorandum of understanding or some other mutually acceptable agreement with the other state(s). The offsets created in the other state are real, surplus, permanent, quantifiable, and federally enforceable.

- E. 310 CMR 7.00: Appendix B (3) applicants must obtain five (5) percent more ERCs than the number of ERCs needed for offsets. This five (5) percent must be held as a "set aside" and neither sold nor used. The Permittee must obtain 1.26 times maximum facility NO<sub>x</sub> emissions or 214 tons of NO<sub>x</sub>. Offsets must be from the same non-attainment area or from another non-attainment area of equal or more severe non-attainment classification (if emissions from this other area contribute to ozone non-attainment in the area where the new project will be constructed).
- F. The Permittee has purchased 214 tons of NO<sub>x</sub> offsets from the Nantucket Electric Company (NEC) as a result of NEC's shutdown of the Nantucket Electric Company's Candle Street generating facility in Nantucket, Massachusetts. NEC's offsets have been officially certified by the MassDEP as of March 20, 1998 (MassDEP Approval #4B7058).

## **NEW SOURCE PERFORMANCE STANDARDS**

The Facility is considered an electric utility stationary gas turbine since more than one third of its net electrical output will be sold. The New Source Performance Standards (NSPS) for gas turbines, 40 CFR 60 Subpart GG, will be applicable to the Facility. The NSPS restricts NO<sub>x</sub> emissions to a nominal value of 75 ppm (approximately equivalent to 0.3 lb/MMBTU) for an electric utility gas turbine of 100 MMBTU/hr or greater. The Permittee will meet this limit through water injection in conjunction with SCR add-on NO<sub>x</sub> controls. Subpart GG also has sulfur restrictions that will be met by using natural gas and ultra-low sulfur fuel oil.

## **TITLE IV SULFUR DIOXIDE ALLOWANCES AND MONITORING**

- A. According to 40 CFR 72, the Facility was designated as a Phase II Acid Rain "New Affected Unit" on January 1, 2000 or 90 days after commencement of activities, whichever comes later, but not after the date the facility declares itself commercial. The application from the Permittee was dated December 30, 1997.
- B. The Acid Rain Program seeks reductions of sulfur dioxide (SO<sub>2</sub>) emissions by allocating a limited number of marketable allowances primarily to existing power plants and by requiring all plants, including new plants that were not allocated allowances, to hold or obtain allowances to offset their actual SO<sub>2</sub> emissions. Allowances are available from a company or individual who holds them or at EPA's Annual SO<sub>2</sub> Allowance Auction and will need to be secured by the Permittee. The first date the Permittee was required to hold allowances for the Facility was January 30, 2001.

- C. The Permittee is required to have a designated representative (DR). The DR is the facility representative responsible for submitting required permits, compliance plans, emissions monitoring reports, offset plans, compliance certification, and is the responsible official concerning all matters under the acid rain program.
- D. The Permittee was required to install a continuous emissions monitoring system (CEMS) on the combustion turbine. The MassDEP issued the approval for the CEMS on August 31, 1999. The CEMs are specified in 40 CFR 75 for monitoring SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub> emissions as well as volumetric flow of the flue gas. As an option, EPA allows gas and oil fired facilities to conduct fuel sampling and analysis and fuel flow monitoring in place of SO<sub>2</sub> continuous emission monitoring and flue gas flow monitoring. In addition, pursuant to 40 CFR 75.13, CO<sub>2</sub> emissions may be estimated in accordance with 40 CFR 75 Appendix G, in lieu of installing a CO<sub>2</sub> CEM.

## **NOISE REQUIREMENTS**

### **A. Background**

1. Daytime and nighttime sound measurements were taken at six locations around the site prior to initial permitting. The sound measurements consisted of both A-weighted sound pressure levels and octave band.
2. MassDEP Policy 90-001 provides that an increase in sound by more than 10 dBA over the existing L<sub>90</sub> ambient level, unless otherwise specified, will be considered a violation of the air quality regulations. Additionally, pure tone sounds, defined as any octave band level, which exceeds the levels in adjacent octave bands by 3 dBA or more, will also be a violation.
3. The MassDEP may exercise its discretion to allow a sound increase above the 10-dBA guideline despite the use of extensive sound control measures. This may occur when the impact is at an area where residents or other sensitive receptors are not located at the time the permit is issued.
4. Ambient noise surveys were conducted to characterize the existing sound levels in the site vicinity. In general, background (L<sub>90</sub>) levels (in dBA) averaged from the mid 30s to mid 40s during nighttime hours and in the low-to-high 40s during daytime hours. The Permittee projected that sound caused by the Facility would not cause conditions of noise. Furthermore, the Permittee committed to the Energy Facility Siting Board to levels below the maximums allowed by MassDEP policy at certain locations.
5. Notwithstanding the footnote to section B. below, the Permittee has proposed the transfer of a parcel of land (25.35 acres) in the northwest corner of the property, known as "Parcel B," to the Town of Charlton subject to a noise easement and certain restrictions such as the prohibition of residential development of the parcel. On April 26, 2004, the MassDEP

determined that the proposed transfer deed provided by the Permittee by letter dated January 23, 2004 is acceptable to the MassDEP and would ensure that the proposed transfer would not contravene any of the provisions of this Plan Approval. Provided that the final form of the deed contains such covenants in a form acceptable to the MassDEP, no further amendment of this Plan Approval shall be required prior to the transfer of the parcel. If Parcel B were transferred with the restrictions described in this paragraph, future noise testing would consider the "property boundaries" as including Parcel B.

## B. Noise Limits

The Facility was designed, constructed and shall be operated and maintained such that at all times:

1. No condition of air pollution will be caused by emissions of sound as provided in 310 CMR 7.01 General Regulations to Prevent Air Pollution;
2. No sound emissions resulting in noise will occur as provided in 310 CMR 7.10 Noise and the MassDEP's Policy 90-001 and the Environmental Facility Siting Board committed levels whichever is more restrictive.

## C. Sound Measurements

The Permittee conducted a post construction ambient sound measurement survey in accordance with MassDEP procedures/guidelines to verify compliance with this Plan Approval. The MassDEP determined that Facility noise emissions from that survey complied with this Plan Approval.

## D. Noise Abatement Equipment and Procedures

Noise impacts associated with the operation of the Facility are mitigated through the incorporation of a series of design features selected specifically to minimize impacts both at the property boundary and at the nearest residential receptors in all directions. The plant layout was designed to optimize the shielding effects of buildings, a comprehensive analysis of possible mitigation measures was conducted to develop the most practical and effective overall noise abatement design with modeling results indicating that operation of the Facility will result in community noise level increases of 10 dBA or less at all noise-sensitive locations. The noise modeling analysis assumed the incorporation of a series of noise abatement technologies that constituted a "baseline" noise mitigation package, as follows:

- A sound absorbing turbine building including 18 gauge metal siding, four inches of insulation, and low noise fans;
- Silencing of air inlets to the combustion turbine;
- Silencing baffles in the Heat Recovery Steam Generator (HRSG) stack to attenuate exhaust noise;
- Aerodynamically designed low noise fans in the cooling tower;

- Acoustical barrier walls around the HRSG structure composed of siding and insulation; and
- Special low-noise design transformers

E. Response to Noncompliance

1. On receiving information that the Facility may be in non-compliance with the provisions of this Plan Approval regarding sound emission levels, the Permittee shall immediately take the following actions:
  - a. Take all reasonable interim steps to eliminate or minimize sound emissions and to return to compliance.
  - b. Investigate immediately the cause of sound emissions and develop a plan to mitigate sound emission levels if deemed in non-compliance.
  - c. Notify the MassDEP Central Regional Office, Bureau of Air and Waste immediately on receipt of information that the Facility may be in non-compliance and propose a plan and schedule to mitigate the source of sound emissions.
  - d. On completion of the proposed mitigation, the Permittee will submit a final report of mitigation to the MassDEP.
2. Should noncompliance with this Plan Approval or the MassDEP regulations as a result of sound emissions from the Facility continue despite the steps implemented as a result of interim steps as described above, the Permittee shall, unless otherwise ordered by the MassDEP, submit within 30 days of receipt of information of noncompliance from the MassDEP or other credible source, whichever is earlier, a sound reduction plan for MassDEP approval. The sound reduction plan shall include the additional monitoring and remedial actions the Permittee proposes to implement in order to return to compliance and verify the return to compliance, and a schedule for the commencement and completion of each major component of the sound reduction plan.
3. Except as otherwise ordered by the MassDEP, the schedule for completion of the sound reduction plan shall not exceed thirty (30) days from the MassDEP's approval of the sound reduction plan, or applicable part(s) thereof, unless the Permittee adequately demonstrates that the work cannot be completed within thirty days by using its best efforts. In reviewing a best efforts demonstration, the MassDEP will not consider delays that could have been reasonably avoided had the Facility been designed and constructed in a manner to facilitate the timely completion of the proposed remedial actions, including, for example, installation of additional sound reduction equipment, sound containment structures or other sound barriers.
4. If the remedial actions are not completed in accordance with the sound reduction plan approved by the MassDEP and there is continuing noncompliance with the sound emission levels established in this Plan Approval or in regulation, then the Permittee shall, unless otherwise ordered by the MassDEP, modify the operations of the Facility in order to return

to compliance. Such actions shall include, as necessary, reduction of the Facility's operating capacity, restriction of its hours of operations, or suspension of operations. The modifications shall commence on the first day beyond the established sound reduction plan completion date and continue until the operator certifies in writing to the MassDEP that all the remedial actions are completed.

5. Nothing in this Plan Approval shall be interpreted to restrict, limit or in any way impair the MassDEP's authority to institute such administrative or judicial enforcement actions as it deems necessary in response to noncompliance with the terms and provisions of this Plan Approval or the MassDEP's regulations.

## **SECTION 61 FINDINGS**

The Permittee's Environmental Impact Report and the approval of the Energy Facilities Siting Board was carefully considered prior to issuance of the original Conditional Plan Approval and Final Plan Approval and was considered again in the issuance of the Amended Final 7.02 Air Quality Plan Approval on March 16, 2005. The MassDEP found that the Permittee has used all feasible means and measures to avoid or minimize adverse environmental impacts to the ambient air. Measures the MassDEP deemed necessary to mitigate or prevent harm to the environment were included in the conditions of March 15, 2005 Plan Approval. The MassDEP has made its decision in accordance with the provisions of 301 CMR 11.01(4) and 11.12.

MassDEP has determined that the filing of an Environmental Notification Form (ENF) with the Secretary of Energy & Environmental Affairs, for air quality control purposes, was not required prior to the issuance of the Plan Approval (Tr. No. X265042) by MassDEP.

## **ATTACHMENT "A"**

### List of Pertinent Information for Transmittal No. 130921

- PSD/NSR Air Plan Approval Applications, Date Received: December 6, 1996
- Air Quality Modeling Protocols, Dated: October 4, 1996
- PSD/NSR Air Plan Approval, Application Addendums, Date Received: September 5, 1997
- Supplemental data letters submitted: November 3, November 6 and 7, 1997
- US Generating Company, Millennium Power Project Plot Plan - Drawing No: C2-0010-002
- US Generating Company, Millennium Power Project, General Arrangement Elevation View-drawing No: PI-0190-001
- EOE/MEPA – Final Environmental Impact Report - decision dated November 27, 1997
- EFSB decision dated March 25, 1998
- DEP Conditional Air Approval Tr. No. 130921 dated January 29, 1998
- Acid Rain Permit dated December 30, 1997
- CEM system approval dated August 31, 1999
- Ammonia storage modification approval dated March 17, 1999
- SCR and CO systems O&M dated August 31, 1999
- NOx offset "notice of ownership" May 5, 1998
- Operating and Maintenance procedures material and instruction
- Miscellaneous field erection plans, drawings and pertinent data related to the construction and installation of major facility components including the gas and steam turbines, HRSG, stack, NOx controls including the ammonia system and the SCR, CO catalyst, cooling tower, plant equipment final layout, steam and gas piping, noise abatement, and controls.
- Analysis of Startup and Shutdown Emissions, Millennium Power Project, Charlton – January 17, 2003
- DEP request for additional startup emissions information letter dated February 6, 2003 and Millennium Power response letter February 28, 2003

### List of Pertinent Information for Transmittal No. X265042

- Limited Plan Application for Fuel Utilization Emission Unit, April 10, 2015
- Air Quality Impact Analysis of April 22, 2015
- Responses to questions on LPA of May 27, 2015
- Supplemental Submittal of June 2, 2015
- Millennium Power – responses to questions of June 5, 2015

- Responses to questions of June 24, 2015
- Approval to extend plan approval decision date of June 24, 2015
- Responses to questions on LPA, Cooling Tower Blowdown Analysis and Cooling Tower potential emissions of June 26, 2015
- Potential HAP emission estimate of June 30, 2015
- 40 CFR 60 Subpart KKKK Analysis of July 9, 2015
- Submittal of August 19, 2016
- Responses to questions of September 1, 2016
- Submittal of September 8, 2016
- Submittal of September 15, 2016
- Submittal of October 17, 2016
- Submittal of October 21, 2016
- Submittal of October 24, 2016
- Submittal of October 25, 2016
- Submittal of November 7, 2016